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PART II:

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

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AIRCRAFT APPROACH NOISE

Abatement

Title 14—Aeronautics and Space

CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

[Docket No. 15020; Amdt. 91-134]

PART 91—GENERAL OPERATING AND FLIGHT RULES

Noise Abatement Landing Flap Amendment and Decision Not to Prescribe Two-Segment Approach Requirements Submitted by Environmental Protection Agency

This document contains an amendment to Part 91 of the Federal Aviation Regulations (14 CFR Part 91) requiring use of noise abatement flap settings where appropriate, and a notice of decision not to prescribe a two-segment approach under visual conditions for civil turbojet-powered airplanes or a two-segment instrument landing system (ILS) approach for civil turbojet-powered airplanes. This action involves an amendment to § 91.85 of the Federal Aviation Regulations that requires the use of the minimum certificated landing flap setting for civil turbojet-powered airplanes.

This document also gives notice of FAA's decision, pursuant to section 611 (c) (1) of the Federal Aviation Act of 1958, as amended, not to prescribe further amendments to the Federal Aviation Regulations concerning approach flap setting procedures based upon the proposals contained in an EPA recommended regulation (Notice No. 75-35). However, as part of the FAA response to the EPA recommended regulation, the FAA is also issuing a separate notice of proposed rulemaking (NPRM) under section 611(b) (1) of the Federal Aviation Act of 1958, as amended, containing a proposal that is beyond the scope of the EPA recommended regulation in Notice No. 75-35. That NPRM is published in the "Proposed Rule" portion of today's FEDERAL REGISTER. If adopted, the proposed rule would require pilots of all turbojet-powered airplanes to delay their landing flap setting until 1,000 feet above the airport elevation under both VFR and IFR conditions, unless the pilot determines that it is necessary in the interest of safety to select the final landing flap setting at a higher altitude.

I. NOTICE NO. 75-35, PUBLIC HEARING, AND COMMENTS CONSIDERED

On August 29, 1975, the EPA submitted to the FAA three separate proposed amendments to the Federal Aviation Regulations (FARs) for consideration and publication in the FEDERAL REGISTER under section 611(c) of the Federal Aviation Act of 1958, as amended ("the Act"). Accordingly, the FAA issued Notice No. 75-35 containing EPA's recommended regulations. Notice No. 75-35 was published in the FEDERAL REGISTER on September 25, 1975 (40 FR 44256), inviting interested persons to participate in the making of the proposed rule by submitting written comments.

Pursuant to section 611(c) of the Act and based upon a notice published in the FEDERAL REGISTER on September 25, 1975 (40 FR 44184), a public hearing was held in Washington, D.C., on November 5, 1975, to receive oral and written statements on the matters contained in the notice. Written, statements submitted and a transcript of the oral statements are included in the regulatory docket.

The FAA has given due and careful consideration to the information provided by the EPA, by federal government-sponsored research programs, by the written and oral statements presented at the public hearing, and by the comments submitted to the regulatory docket. In addition, the FAA has consulted with the EPA and with the Secretary of Transportation. Based on an analysis of this information and after consultation, the FAA concludes that it should adopt an amendment to the FARs based on Proposal I contained in the EPA recommended regulations but should not prescribe regulations based on Proposals II and III.

Numerous written or oral comments in response to Notice No. 75-35 were received from private citizens, citizen groups, aviation trade and user associations, Federal Government agencies, the Council on Wage and Price Stability, and foreign, state, and local governments. These comments, including oral presentations at the public hearing, address or affect the EPA proposals.

II. FLAP SETTING PROCEDURES FOR CIVIL TURBOJET-POWERED AIRPLANES

As stated in the Notice, the EPA proposed to amend § 91.85 of the FARs to provide noise relief to communities in the vicinity of airports by prescribing reduced flap setting procedures for civil turbojet-powered airplanes. This proposal was based on studies referenced in the EPA proposal showing that an approach made with less than full landing flaps reduces aircraft noise as compared to a full flap approach, since the airframe drag at the reduced settings is less, lower power is required. The reduced flap procedure for each type of turbojet-powered airplane would, as proposed, consist of the minimum final flap setting shown in the Airplane Flight Manual that is appropriate and safe for landing, based upon such factors as load, weather, runway conditions, etc. However, the EPA proposal expressly recognized that each pilot in command of an airplane has the final authority and responsibility for the safe operation of his airplane. Therefore, if the pilot in command determines, in the interest of safety that a higher flap setting for that airplane should be used for a particular approach and landing, the pilot may, under the EPA proposal, use the higher flap setting.

The explanation for the EPA reduced flap proposal stated that certain air carriers are currently using a reduced flap procedure and that the Air Transport Association recommended continuation of the reduced flap approach. The explanation further stated that "[s]ince the procedure is considered safe and will achieve an appreciable reduction in noise caused by civil turbojet engine-powered airplanes, it is proposed to make the use of a reduced flap procedure mandatory for all civil turbojet engine-powered airplanes."

The flap setting procedures developed by the Air Transport Association (ATA), which are currently used by many air carrier pilots for noise abatement (and fuel conservation) purposes at all airports with many types of approaches (ILS, VOR, Visual, etc.), both IFR and VFR, are as follows:

1. Approach the airport area at as high an altitude as possible in accordance with current ATC procedures.
2. Remain in a clean configuration for as long as possible.
3. Proceed in-bound from the final approach fix, or a similar distance for a visual approach, with flaps at one setting less than final landing flaps planned for the particular landing.
4. Extend final landing flaps at a point on final approach at which the aircraft is 1000 feet above field elevation, equipment performance permitting, with stabilization at not less than 500 feet above field elevation.
5. Use the lowest allowable landing flap setting which is permissible for the particular landing.

The ATA procedures also recommend that initiation of each successive flap extension be made at a speed near the minimum speed, for that particular configuration, to maximize noise abatement benefits. The FAA encourages air carriers to use these procedures and has approved their use, on a case-by-case basis, by individual operators where fully consistent with safety. In addition to issuance of the reduced landing flap requirements contained herein, the FAA is continuing its effort to encourage broader use of these procedures where consistent with the highest degree of safety for each operator on an individual basis.

The EPA proposed rule differed from the procedure recommended by ATA. Proposed § 91.85(c) would require pilots of all turbojet-powered airplanes to "use the minimum certificated flap setting set forth in the Airplane Flight Manual that is appropriate to each phase of that approach and landing." However, there is no minimum certificated flap setting appropriate to each phase of the approach and landing since there are no defined phases of the approach and landing in the regulations or in the Airplane Flight Manual. The ATA procedure, however, defines two points in the arrival path of the airplane—the final approach fix or a similar distance for a visual approach; and 1,000 feet above the field elevation on final approach.

The FAA does approve certain landing and approach flap settings that are included in approved performance information in the Airplane Flight Manual. In addition, certain larger airplanes have more than one approach flap setting and more than one landing flap setting. The FAA, however, does not specify when in the arrival sequence the approach or landing flap setting must be used. The FAA does not believe it is within the scope of the EPA proposal to add a new regulatory definition prescrib-

ing, for all operators, and operating conditions, when each approach phase begins and when each landing phase begins. However, the FAA believes that delaying the final landing flap setting to a point where a stabilized final approach can still be achieved is a valid means of abating noise during the early phases of the approach without compromising safety.

In consideration of the success of the delayed landing flap procedure recommended by ATA (item No. 4) and the FAA's determination that adoption of this procedure in this amendment would be beyond the scope of proposed § 91.85 (c) concerning reduced flaps, the FAA is proposing a rule to specify the highest altitude at which the landing flap setting can be selected. This proposal is included in an NPRM that is being published in the "Proposed Rule" section of today's FEDERAL REGISTER. The proposal would apply to all pilots of turbojet-powered airplanes regardless of the number of certificated landing flap settings. If adopted, the proposed rule would require that a landing flap setting be selected at an altitude no higher than 1,000 feet above the airport elevation.

The FAA has determined that it is within the scope of the EPA reduced flap proposal to require that for turbojet-powered airplanes certificated with more than one landing flap setting, the pilot in command shall use the minimum certificated landing flap setting for the appropriate conditions. In addition, the FAA believes it is necessary to allow the use of all landing flap settings for training and certification flights. The proposal, as adopted, has been revised accordingly.

The majority of comments were in favor of the EPA reduced flap proposal at least in context. Many of these commenters, however, suggested modifications or clarifications. The comments suggesting changes and the comments objecting to this proposal will be included in the discussion of the reduced flap proposal. Other comments on this proposal are more relevant to the two-segment approach concept and will be included in the two-segment approach discussion.

Several commenters supported the proposal but pointed out that increased landing speeds, heavy braking, and increased use of thrust reversers that might result from a reduction in flap settings should in no way impinge upon safety. The FAA believes that the slight increase in landing speeds (e.g., approximately four knots for a Boeing 727) is consistent with safety, and that unusual braking or stopping methods will not be required.

One commenter stated that pilots would comply with reduced flap landing profiles if encouraged by an advisory circular, but that it should not be a regulatory requirement. The FAA believes reliance on voluntary response to an advisory circular might not be sufficient, and a regulatory requirement would be more effective in assuring the use of this procedure by all segments of aviation that would be covered by the rule.

Commenters opposed to the proposal were particularly concerned that safety would be derogated, with some risk to the lives of passengers, and pointed out that the primary responsibility for flight operational safety lies with the pilot. These commenters pointed out that aircraft are certificated to operate most safely in flap profiles dictated by gross weight, meteorological conditions, landing surface conditions (i.e., wet, short, icy, high, hot, etc.), and that such prerogatives should not be taken from the pilot. Two commenters questioned the use of making such requirements regulatory, while simultaneously providing approval for the pilot not to comply if, in his judgment, a different flap setting is necessary in the interest of safety. The FAA believes that the issuance of a regulation will result in more benefit, in terms of noise reduction, than would an advisory circular, but also recognizes that the primary responsibility for the safety of the aircraft is with the pilot. Accordingly, the regulation provides that, in the interest of safety, the pilot may use a different flap setting.

Another comment stated that the most effective method of abating aircraft noise was to enact zoning ordinances in the vicinity of airports, or achieve quieter turbojet engines through technology applied at the source. While those suggested methods may ultimately produce a great benefit, they are beyond the scope of this proposal, which describes a procedure that is effective and can safely be implemented now. Most commenters opposed to the proposal asserted that use of reduced flap settings would reduce noise levels by an insignificant amount in the approach path, but that increased landing speed would result in increased use of reverse thrust on landing. They claimed that the net effect of this would be more noise in the vicinity of airports and, incidentally, would offset the fuel savings achieved during the approach. While the landing speeds are increased slightly, the FAA has concluded that the landing can be conducted safely and routinely without increased use of reverse thrust, thereby preserving the fuel savings, achieved during the descent.

Presentations made at the public hearing relative to this EPA proposal were from various sources in the industry, and were generally favorable, some with qualified approval.

One comment suggested a review of the aircraft flight manuals to insure that adequate flight and performance data is included. However, the regulation issued herein is applicable only to those operators whose aircraft flight manuals contain approved reduced landing flap settings. This will assure that required flap settings are based on adequate flight and performance data.

Another person commented that a stabilized approach at reduced flap settings should be used in order to establish consistency of touchdown points on the runway and avoid overruns, landings short of the runway, and other hazards associated with the critical approach and landing phase. Also, the time delay to spool up turbojet engines for a go-around could, he stated, be a factor with reduced flap approaches since the power required during the approach is less. He concluded, however, that experience has shown that the reduced flap technique has proven effective and safe.

Another person, in support of the proposal, commented that by flying a properly conducted single-segment approach, employing the reduced flap technique, noise reduction equal to or better than that obtained using the two-segment approach could be achieved. He stated that, if started from the same altitude, the reduced flap approach results in a savings of 100 to 200 pounds of fuel per approach, and any advantage of the two-segment approach is confined to noise levels of 95 EPNdb or less, and then only with regard to 707 aircraft. He further stated, and the FAA agrees, that a reduced flap procedure requires minimum training with no new equipment cost or complications resulting therefrom and, most importantly, it is safe. This procedure has been in use by certain segments of the aviation industry for over three years. It does not require new equipment costs or extensive training. So long as the airplane has been certificated at the reduced flap setting for approach and landing and the pilot is aware of the considerations appropriate to his airplane which may preclude a reduced flap setting, the procedure can be safe and effective.

Although the reduced landing flap procedure is being used by many operators, the FAA believes that certain operators may need time for implementation. For example, certain operators may find it necessary to revise their training programs or operations manuals, or both. Therefore, the proposal as adopted provides a reasonable period after the effective date of the amendment for implementation.

The cost required to implement this amendment to FAR 91.85 are estimated to be insignificant. No reduction in runway/airport capacity is anticipated. No new approach facilities need to be installed. There will be noise abatement at essentially all turbojet-served airports and reduced fuel consumption during the final phase of the approach.

In summary, this amendment, as adopted, applies to the pilot in command of all civil turbojet-powered airplanes, U.S., or foreign, for which the certificating authority has approved more than one landing flap setting and for which the appropriate performance information is set forth in the Airplane Flight Manual.

III. NOTICE OF DECISION NOT TO PRESCRIBE REGULATIONS

A. REGULATIONS PROPOSED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA)

The EPA also proposed to the FAA on August 29, 1975, a visual two-segment noise abatement approach requirement for turbojet-powered airplanes. (EPA Proposal II) and a two-segment ILS noise abatement approach for turbojet-pow-

ered airplanes (EPA Proposal III). A two-segment approach to the landing runway would require the pilot to fly an initial steep glide path segment (six degrees as proposed) and to intercept the conventional glide path (generally three degrees) at approximately 700 feet altitude above the elevation of the airport. Approval of both types of two-segment approaches would, under the EPA proposal, be made by the FAA and portrayed on appropriate aeronautical charts.

EPA Proposal II. The proposal would amend § 91.87 of the Federal Aviation Regulations to require that pilots of all civil turbojet-powered airplanes, when landing on a runway with an approved visual two-segment approach during visual weather conditions, use that two-segment approach. Visual weather conditions were defined as—(1) daylight hours; (2) ceiling at or above 3,000 feet; and (3) flight visibility at or greater than 5 nautical miles. EPA stated that a two-segment approach under these visual conditions, using a conventional ILS and colocated distance measuring equipment (DME), was needed since a two-segment ILS approach would not be achieved for several years and prompt action is needed to protect the public health and welfare. EPA further stated that the visual two-segment approach would cause significant noise reduction at those airports having the necessary facilities, although recognizing that very few airports had those facilities.

Four commenters favored the proposal as published, and four commenters favored the proposals with stipulations and provisos. Twenty-two commenters opposed the proposal, and thirteen either did not specifically express an opinion or made comments beyond the scope of the proposal.

The comments favoring EPA Proposal II, as published, were generally comprised of airport administrations and individual citizens and one citizen group living in close proximity to an airport. These comments were based, essentially, on the need for noise abatement benefits. Other commenters favored the proposal if no increase in the number of accidents would result, aircrews received proper training, appropriate minimum cloud ceilings and visibilities were established, icing conditions were not present, the tailwind on the upper segment was limited to 15 knots, and the equipment proved reliable. One commenter who favored the proposal stated that any perceptible increase in the accident rate could reverse the cost/benefit of the approach.

Comments opposed to the proposal were received from individuals, airmen, foreign governments, domestic and international pilots groups, the National Transportation Safety Board, and municipal and state governments. The central objection by these comments was lack of safety involved in any two-segment approach. In brief, the following safety objections were made by the commenters:

1. An icing hazard would occur in the upper steep segment because the low power setting would cause bleed air from the engine to be insufficient to prevent ice accumulations.

2. The high sink rate occurring in the upper segment of the approach is hazardous and beyond the design specifications of some air carrier airplanes and electronic equipment.

3. The transition from the upper segment to the lower segment would be at too low an altitude.

4. The wage vortex turbulence would increase significantly for airplanes on a conventional approach.

5. The approach would be a nonstandard approach when used at only 55 airports.

6. Tailwinds would be critical for the upper segment glide slope.

7. Wind shear would be critical for the upper segment glide slope.

8. The descent rate would be greater than the current policy limitation of 1,000 feet per minute (FPM).

9. Pilot workload would be increased, during a critical phase of flight, at the transition from the upper segment slope to the conventional glide path.

10. Engine lag time is unpredictable at low altitude and a high rate of descent.

11. All airplanes cannot fly the proposed steep-segment descent of approximately six degrees.

12. The procedure is contrary to the stabilized approach procedure that has contributed so much to flight safety since the turbine-powered airplane began operation.

13. The two-segment approach must have a glide slope during the entire approach including the steep-segment.

The opposing commenters also presented airspace and equipment problems. Commenters stated that available airspace would decrease 14.3 percent in terminal areas and that the needed colocated distance measuring equipment does not exist at most of the named airports. The commenters suggested that traffic regulation, especially with the mix of approaches, would create an unacceptable workload for the air traffic controller.

Many of the commenters that opposed EPA Proposal II challenged all or part of EPA's contentions regarding cost savings and noise reduction. Some of the commenters stated that the procedure would result in an overall increase in noise levels and fuel consumption since missed approaches would likely become more frequent and large power applications would often occur to reduce the rate of descent upon interception of the three degree glide path.

EPA Proposal III. The proposal would amend § 91.87 of the Federal Aviation Regulations to require that pilots of all civil turbojet-powered airplanes, when making an approach for a landing on a runway having an approved two-segment ILS approach procedure, use that two-segment procedure. EPA stated that the two-segment ILS approach can provide significant noise reduction.

Six commenters favored the proposal as published and three commenters favored the proposal with stipulations and provisos. Twenty-four commenters opposed the proposal and ten either did not specifically express an opinion or made comments beyond the scope of the proposal.

Commenters favoring the proposal were comprised of one citizen group and individual citizens living in close proximity to an airport, airport administrations, and municipal governments. The commenters agreed with the need for noise abatement and the same general stipulations and provisos listed for the visual two-segment approach were stated for the two-segment ILS.

One comment was in favor of publishing an advisory circular concerning the two-segment ILS approach, but recommended that it not be made regulatory. The commenter further recommended that the four-degree glide slope be pursued.

Strong opposition was expressed concerning EPA Proposal III by twenty-four commenters on the basis that such a maneuver performed in instrument conditions is dangerous and could not be performed within design limitations of a significant number of airplanes. These commenters included individual airmen, domestic and foreign pilot organizations, airline organizations, foreign governments, the National Transportation Safety Board, and a number of municipal and state governments.

Opposing commenters stated that the two-segment ILS approach was not safe due to a variety of events that could adversely affect safe accomplishment of the approach. The commenters noted that not only could the airplane's limits be exceeded but that the proposed approach may exceed the ability of the pilot to correct. In addition, the same safety objections that were made for the visual two-segment approach and listed in the previous discussion were noted in the comments for the two-segment ILS approach.

One commenter estimated that the minimal cost to install the necessary airborne equipment would be $10,000 per aircraft, with a total fleet cost of over $750,000,000. Another commenter estimated that the price for colocating ILS DME equipment could run several times the EPA estimated cost of about $50,000 each. As for the visual two-segment approach, commenters also questioned the noise benefits of the two-segment ILS because increased missed approaches and significant power application upon interception of the three degree glide slope were considered probable.

B. BACKGROUND

The FAA adopted its first noise abatement procedure for certain airport traffic areas on February 23, 1960. On September 22, 1961, the required procedure was expanded to all airports with a preferential landing runway for noise abatement. This rule, which applies noise abatement runway requirements to all turbine-powered airplanes and to all large airplanes, is prescribed in § 91.87 (g) of Part 91 of the Federal Aviation Regulations. In addition, the FAA began its program to reduce aircraft source noise and to examine other operational

procedures for turbojet-powered airplanes to abate noise in the airport's traffic area. For example, minimum altitude requirements for turbine-powered and large airplanes are prescribed for noise abatement purposes in § 91.87(d). In addition, ILS equipped turbine-powered and large airplanes approaching a runway being served by an ILS are required, for noise abatement purposes, to fly at or above the glide slope during portions of the approach.

The National Aeronautics and Space Administration (NASA) and the FAA have conducted numerous investigations to determine methods for implementing noise abatement procedures and for measuring the noise reduction associated with the various procedures. In 1971, NASA began testing a two-segment approach to prove that two-segment approach avionics would provide safe and acceptable lateral and vertical approach guidance, and to evaluate the noise benefits of such an approach. In 1973, in-service evaluation began at certain selected airports. NASA reported in 1974, Operational Flight Evaluation of the Two-Segment Approach for Use in Airline Service after testing using a Boeing 727–200 airplane that "the system was determined to be safe, easy to fly and compatible with the airline operational environment." This conclusion considered the safety of the Boeing 727–200 airplane flying the two-segment approach but did not consider safety implications of other aircraft on the same approach or other aircraft flying different approaches.

Three transport category airplane manufacturers were using computers and airplane flight simulators during this period to determine the optimum upper slope capability of their turbojet-powered airplanes. The reported results indicate that a variety of upper segment slopes ranging from three degrees to six degrees would be needed to safely accommodate the airplanes that are currently in service.

The development and testing of the two-segment approach by early 1974 indicated that a two-segment instrument landing system (ILS) approach at specified airports might be feasible. An advanced notice of proposed rulemaking (ANPRM) was issued by the FAA and published in the FEDERAL REGISTER on March 26, 1974 (39 FR 11193), to invite early public participation in the identification and selection of a course or alternate courses of action concerning two-segment ILS approaches. Further research of the two-segment approach and the comments received in response to the advanced notice indicated that the FAA should give further consideration to the possible wake vortex hazard that could be associated with the complete implementation of a two-segment approach.

Although many questions remain to be answered, wake vortex is a problem generally associated with the characteristics of an airplane wing. The lift generated by the shape of a wing (airfoil) is caused by an area of high pressure on the bottom of the wing as compared to an area of lower pressure on top of the wing. This pressure differential triggers invisible counter rotating vortices from the wing tips of an airplane. The initial strength of the vortex is governed in part by the weight, speed, and shape of the wing of the generating airplane. Flight tests have shown that, except where close to the surface, the vortices from large airplanes sink at an average rate of five feet per second until about 900 feet below the flight level of the generating airplane. The vortex strength diminishes with time and with distance from the point of generation. The wake vortex can be a problem to aircraft following below the flight path of the generating aircraft, especially if the generating aircraft is heavier than the following aircraft. Pilots normally avoid the areas of possible wake vortex problems by flying above the flight path of heavier airplanes or by providing enough separation for the wake vortex to diminish sufficiently.

On July 24 and 25, 1974, the Subcommittee on Aeronautics and Space Technology of the House of Representatives Committee on Science and Aeronautics conducted detailed hearings dealing with aircraft noise abatement. These hearings were a continuation of hearings held by the Subcommittee on December 5, 6, and 13, 1973. Two of the subjects discussed were the two-segment approach research and the rule-making status of the advance notice on two-segment approaches. FAA witnesses stated that the comments presented a number of problems and that the commenters presented issues which still must be resolved. A number of witnesses to the hearing expressed concern about the wake vortex hazard associated with a mix of multiple steep-segment approaches and with a mix of steep-segment and conventional approaches. Witnesses from NASA stated that a full understanding of the operational implications of the wake vortex hazard for an aircraft following an airplane on a two-segment approach remains to be developed.

NASA and FAA reported in January, 1975, "Flight Test Investigation of the Vortex Wake Characteristics Behind a Boeing 727 During Two-Segment and Normal ILS Approaches," that vortex strength was approximately the same for a two-segment approach and for a conventional approach. The report, however, did not address the probability of encountering wake vortex.

A paper, "Wake Vortex Hazard Analysis for the Two-Step Approach Environment", was prepared June, 1975, for the FAA by the Mitre Corporation. The report assumed a situation similar to that which would exist if EPA Proposal II or III were adopted, turbojet-powered airplanes would be required to fly a steep-segment approach and other airplanes could fly a conventional approach. Although the problem of multiple steep-segments was not addressed, the report states that a preliminary analysis has shown the vortex hazard in the mix of steep-segment and conventional approaches to be one to three orders of magnitude greater than that for the conventional approach.

c. CONCLUSION

The FAA agrees that the adverse affects of aircraft noise during approach and landing should be reduced. However, before adopting a proposed regulation submitted by EPA for the control and abatement of aircraft noise, the FAA must consider the factors set forth in section 611(d) of the Federal Aviation Act of 1958, as amended. Section 611 (d)(1) requires the FAA to consider relevant available data relating to aircraft noise including the results of research, development, testing, and evaluation activities. Section 611(d)(3) requires the FAA to consider whether the proposal is consistent with the "highest degree of safety in air commerce or air transportation in the public interest."

The FAA has considered the relevant data available from the research associated with the two-segment approach. Based on existing information of wake vortex generation and persistence, the FAA finds that an unacceptable increase in wake vortex encounters may be anticipated using current minimum aircraft separation standards with any practicable two-segment approach. This finding is believed to be accurate for a mix of conventional and two-segment approaches and for a mix of approach angles for airplanes flying the steep-segment of a two-segment approach.

The additional aircraft spacing needed to allow the wake vortex to diminish sufficiently in strength so that the turbulence would not be a problem would require a doubling of the current separation standards. This would significantly increase enroute and terminal delays and energy consumption. In addition, it would result in inefficient use of the national airspace and in passenger inconvenience. This would seriously derogate the efficiency of ATC and reduce the capacity of the airports involved.

Additionally, the FAA believes that numerous conditions that are hazardous or inimical to flight safety may occur. Among these, which are enumerated above, are icing in the upper steep-segment, the high sink rate with increased engine spool up time, the critical effect of tail winds and wind shear for the upper segment, a descent rate that may exceed present operating limitations, increased pilot work load, and potential airspace and traffic conflicts.

Multiple upper segment slope angles would create a charting problem. The depiction of appropriate capture points and upper segment slope angles to accommodate different types of turbojet-powered airplanes would result in a cluttered approach chart. The complexity of these charts could result in pilot confusion during the critical approach phase of flight. Of the more than 2200 runways currently being used by turbojets, only 100 have been classified as noise sensi-

tive and would be likely candidates for the two-segment approach. Some pilots of turbojet-powered airplanes may experience difficulty interpreting these nonstandard two-segment approaches.

The direct cost of the fleet operators and the FAA facilities system has been estimated as $404 million, and the annual recurring costs commencing in 1980 as $34 million. These are in addition to the indirect costs that would result from doubling the ATC separation criteria to account for the effect of wake turbulence in a mix of two-segment and conventional approaches. The increment in noise abatement achieved by this expenditure over that which is achieved by the reduced flap setting procedure that is being adopted herein, does not justify the direct costs of implementing this procedure.

The FAA believes that the two-segment approaches under visual and instrument conditions are not consistent with the highest degree of safety in air commerce and are not in the public interest. Therefore, the FAA has determined that the two-segment approach, under either visual conditions or under IFR, should not be adopted.

IV. Amendment and Notice of Decision

In consideration of the foregoing, and under the authority of sections 313(a), 601, 604, and 611 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1424, and 1431), as amended by the Noise Control Act of 1972 (Pub. L. 92-574); section 6(c) of the Department of Transportation Act (49 U.S.C. 1655 (c)); Title I, National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.); and Executive Order 11514, dated March 5, 1970, the Federal Aviation Administration hereby takes the following actions:

(1) Notice is hereby given, in accordance with section 611(c)(1)(B) of the Federal Aviation Act of 1958 (49 U.S.C. 1431(c)(1)(B)), that the Federal Aviation Administration is not prescribing a two-segment approach under visual conditions for civil turbojet-powered airplanes (EPA Proposal II) or a two-segment instrument landing system (ILS) approach for civil turbojet-powered airplanes (EPA Proposal III) in response to the Environmental Protection Agency submission of proposed regulations contained in the notice of proposed rulemaking published in the Federal Register on September 25, 1975 (40 FR 44256), and identified as Notice No. 75-35.

(2) In accordance with section 611(c)(1)(A) of the Federal Aviation Act of 1958 (49 U.S.C. 1431(c)(1)(A)), Part 91 of the Federal Aviation Regulation is amended as follows, effective January 28, 1977.

Section 91.85 is amended by adding a new paragraph (c) to read as follows:

§ 91.85 Operating on or in the vicinity of an airport; general rules.

* * * * *

(c) After (a date 60 days after the effective date of this amendment), except when necessary for training or certification, the pilot in command of a civil turbojet-powered airplane shall use, as a final landing flap setting, the minimum certificated landing flap setting set forth in the approved performance information in the Airplane Flight Manual for the applicable conditions. However, each pilot in command has the final authority and responsibility for the safe operation of his airplane, and he may use a different flap setting approved for that airplane if he determines that it is necessary in the interest of safety.

Note.—The Federal Aviation Administration has determined that this document does not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A-107.

Issued in Washington, D.C., on November 15, 1976.

John L. McLucas,
Administrator.

[FR Doc.76-34179 Filed 11-26-76;8:45 am]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

[14 CFR Part 91]

[Docket No. 14234; Reference Notice No. 74-40]

PROPOSED REGULATIONS SUBMITTED BY THE ENVIRONMENTAL PROTECTION AGENCY TO THE FAA: NOISE ABATEMENT MINIMUM ALTITUDES FOR TURBOJET POWERED AIRPLANES IN TERMINAL AREAS

Decision Not To Prescribe Regulations

The purpose of this notice is to announce that the Federal Aviation Administration (FAA) has determined not to prescribe the proposed amendment to the Federal Aviation Regulations (14 CFR Part 91) submitted by the Environmental Protection Agency (EPA) and published in Notice 74-40 (40 FR 1072) in the FEDERAL REGISTER on January 6, 1975, regarding noise abatement minimum altitudes for civil turbojet-powered airplanes operated under either IFR or VFR. This decision is reached in accordance with section 611 of the Federal Aviation Act of 1958, as amended, after a public hearing, consultations with the EPA and the Secretary of Transportation, and after due and careful consideration of the information provided by the EPA and of the written and oral comments presented at the public hearing or submitted to the regulatory docket. However, in reaching this decision, and after comprehensive review of the air traffic flow issues addressed in the EPA proposal, the FAA has developed, and is issuing an internal directive, aimed at the air traffic control function, that it believes will achieve the important noise reduction objectives of the EPA proposal.

Section 611(c)(1) of the Federal Aviation Act of 1958, as amended by the Noise Control Act of 1972 (Pub. L. 92-574; 86 Stat. 1239) (hereinafter referred to as "the Act"), provides that the EPA shall submit to the FAA proposed regulations, or proposed amendments to regulations, to provide control and abatement of aircraft noise and sonic boom which the EPA determines are necessary to protect the public health and welfare. In considering proposals submitted by the EPA, the FAA must publish the proposed regulations in a notice of proposed rulemaking (NPRM) within 30 days of the date of submission to the FAA. Within sixty days after publication of the NPRM, the FAA must conduct a public hearing in which interested persons may participate by making oral or written presentations regarding the proposals contained in the NPRM. Within a reasonable time after the conclusion of the hearing and after consultation with the EPA, the FAA must:

1. Prescribe regulations which are either substantially as submitted by the EPA, or which are a modification of the EPA proposal; or

2. Publish in the FEDERAL REGISTER a notice that it is not prescribing any regulation in response to EPA's submission, together with a detailed explanation providing reasons for the decision not to prescribe EPA's proposed regulations. This document constitutes such an explanation.

On December 6, 1974, the EPA submitted to the FAA a proposal relating to aircraft noise control and abatement that would prescribe minimum altitudes for civil turbojet-powered airplanes in terminal areas. In conformity with section 611(c), the FAA, on December 31, 1974, issued a NPRM proposing the amendment to the Federal Aviation Regulations submitted by the EPA. This notice (No. 74-40) was published on January 6, 1975 (40 FR 1072). Pursuant to a notice published in the FEDERAL REGISTER on January 30, 1975 (40 FR 4478), a public hearing was held at FAA Headquarters, Washington, D.C. on March 5, 1975.

The objective of the Environmental Protection Agency was to propose a rule which would help to reduce the noise exposure on the ground due to low altitude flight of turbojet-powered airplanes by requiring them, by regulation, to maintain certain minimum altitudes, including the recommended altitude limitations and operational procedures of the "Keep-'em-High" program described in FAA Advisory Circular 90-59 (AC 90-59), and to maintain an altitude of at least 3,000 feet above ground level (AGL) until beginning descent on the approach glide slope.

The EPA proposal contained the following recommendations:

a. Add a regulatory definition of the term "terminal area" to Part 91 and authorize Air Traffic Control (ATC) to designate the boundaries of the terminal area to accommodate the flight procedures needed for operation to or from a particular airport.

b. Require civil turbojet-powered aircraft, approaching the airport for a landing, to:

(1) Enter the terminal area at 10,000 feet AGL and remain at that altitude until further descent is required for a safe landing;

(2) Maintain at least 5,000 feet AGL until in the descent area established by ATC for the direction of the landing runway;

(3) Maintain at least 3,000 feet AGL until intercepting the glide slope; and

(4) Fly at or above the glide slope from the point of interception to the middle marker, or, at an airport with a visual approach slope indicator (VASI), fly at or above the glide slope until a lower altitude is necessary for a safe landing. The EPA proposal provided, in the case of VFR operations to a runway not served by an ILS or VASI, that "the rate of descent shall not be less than three degrees."

c. Revise the present § 91.87(d)(1) to exclude turbojet-powered airplanes from the applicability of the less stringent procedures prescribed in that section.

Section 611 of the Act requires that the FAA shall consider whether any proposed standard or regulation is:

a. Consistent with the highest degree of safety in air commerce or air transportation in the public interest;

b. Economically reasonable;

c. Technologically practicable; and

d. Appropriate for the particular type of aircraft, aircraft engine, appliance, or certificate to which it will apply.

After consideration of these factors, after consultation with EPA, and after due and careful consideration of the information provided by EPA, and of the public comments submitted in response to Notice 74-40 as well as all written and oral submissions at the public hearing (Docket No. 14234), the FAA has determined not to prescribe any regulation in response to EPA's proposed "Noise Abatement Minimum Altitude for Turbojet Powered Airplanes in Terminal Areas," as submitted to the FAA on December 6, 1974.

Fifty-three public comments were received in response to Notice 74-40; 25 supporting the proposal and 28 opposing. The public comments are categorized as follows:

	Supporting	Opposing	Total
Aviation user organizations	1	5	6
Civic associations and consumer organizations	4	1	5
State and local government	14	3	17
Business corporation	4	7	11
Individuals	2	12	14
Total	25	28	53

Comments favorable to the proposed amendment were received primarily from local government representatives and civic associations. They concluded that the proposed rule would do much to reduce aircraft noise pollution and should be implemented without delay. Some of these supporting comments stated that the proposal appeared fair and reasonable and that the rules would have little or no impact on aircraft operations or ATC. It was also suggested that the proposed regulations would provide immediate relief, and with little cost as compared to retrofitting present aircraft with specific engines. Some of the supporting comments, however, qualified their support by stating that any new rules must be compatible with ATC responsibilities, consistent with safety, and not cause excessive delays. The one aviation related organization supporting the proposal represented airport operators. It stated that airports are a focal point for adverse citizen reaction; consequently, airport operators are particularly interested in solving the noise problem, and they support the proposal in principle. The commenter realized that adopting the proposal would formalize, by regulation, a wide-spread practice that is now prescribed by nonregulatory ATC procedures, and that there may be local air traffic and related operational conditions that do not permit the implementation of the "Keep-'em-High" program, even in its nonregulatory form. Therefore, any regulation based on these procedures would have to provide for

similar exceptions. Recognizing that it is not qualified to make a technical judgment, the commenter favored the 3000-foot intercept concept if consistent with safety. The civic associations and consumer organizations supporting the proposal generally endorsed the proposal without detailed analysis, as did one state, and several local governments, with the phrase "the new regulation would do much to reduce aircraft noise pollution level" appearing repeatedly in these comments. A few of these comments specifically approved the 3000-foot intercept concept. The fact that the benefits could be obtained immediately was mentioned.

In the same group of supporting comments, however, one commenter stated that the Notice reflected a lack of knowledge of operating procedures and technology. Other supporters commented that certain areas, such as New York probably should be excepted because of a potential reduction of airport capacity, and that procedures resulting from adoption of the proposal should be thoroughly flight-tested and evaluated. One comment in this group said that imposition of the 10,000-foot provision could severely restrict ATC, and that the noise relief achieved by keeping aircraft above 5,000 feet would be negligible. A number of commenters objected to all restrictions above 3,000 feet, questioned the need for any further action since the present noise perceived on the ground is well below the level considered detrimental, concluded that no real benefits would result, and stated that aircraft woud be subjected to increased exposure in the worst icing levels without justification.

The FAA believes that any reduction of perceived noise resulting from adopting this proposal would not be significant. An examination of 98 noise sensitive runways equipped with ILS revealed that 74 runways have a glide slope at or above 3 degrees and 88 runways are at or above 2.7 degrees. Furthermore, the average intercept altitude above the airport surface for the 98 runways, is already approximately 2,100 feet. The EPA's estimated health and welfare benefits attributed to an increase in the glide slope intercept altitude from 1,500 to 3,000 feet are approximately 6 to 8.5 EPNdB under the flight path in the area 5 to 10 nautical miles from a runway approach threshold. The noise reduction benefits which the EPA has attributed to a higher glide slope intercept represent maximum values at specific measuring points directly underneath the flight path, assuming a worst case situation. A single-event analysis, calculated from changes in peak noise level at single point locations and assuming a 2,100-foot reference intercept altitude, indicates a possible improvement range of between 1.7 and 5.1 EPNdB for all areas along a final approach path by increasing the intercept altitude to 3,000 feet. It is believed that implementation of the improved air traffic management order, discussed below, will yield benefits of the same magnitude.

Many persons commenting on the EPA proposal shared the opinion that the relief obtained by modifying procedures is uniquely determined by the location of the airport, the flight track, and the population centers around the airport. To establish a requirement, as proposed, to funnel all approaches onto an ILS glide slope or to achieve the same descent profile on a runway not served by an ILS glide slope would, in effect, establish an approach gate ten miles from the runway. By such action any community lying underneath such an approach path that may be avoided today by other flight paths would now be exposed continuously to noise from approaching aircraft as the current method of varying the approach path would no longer be allowed under the proposed regulation. This is an example of the importance, discussed below, of leaving the ATC function as free as possible to deal with the complex interplay of environmental and safety impacts of air traffic management. At some airports such as Minneapolis, multipath approaches dilute noise over the close-in-communities. No single community receives all the approach noise. To require the channeling of approaches on a fixed flight path would amount to a decision to concentrate all approach noise over one approach path (and any community along that path). At San Francisco, an approach path offset from the localizer is used to avoid Foster City. At Seattle, there is a "Visual bay approach" that aircraft may use, if there is a ceiling of at least 3,000 feet and visibility of at least four miles, for landings to the south at Seattle-Tacoma Airport. This is a noise abatement approach that places the aircraft over water or an industrial area until approximately five miles from the runway. If the EPA proposal were adopted, the "Visual bay approach," would not be available to turbojet-powered aircraft, and they would be required to fly over the heart of the city of Seattle. The River Approach to Washington National Airport was designed to reduce noise in Georgetown, and Arlington, Virginia, by requiring aircraft to follow the Potomac River to the airport. This approach, also, would be unavailable to turbojet-powered aircraft if the EPA proposal were adopted as proposed.

No single procedure will have the same level of effectiveness at all airports. Each procedure must therefore be evaluated on the basis of each airport. The proposal does not recognize that effective noise abatement and air traffic control require responsiveness to local circumstances and this, in turn, requires great flexibility in air traffic management.

One reply to the docket indicated that the statement "the rate of descent shall not be less than 3 degrees * * *" is ambiguous. It assumed that the proposal meant that the aircraft would follow a three degree glide path angle. However, this is not possible unless the pilot is provided with the proper navigational aids to indicate this flight path angle. Proposed § 91.87(d)(1) refers to * * * "the rate of descent prescribed in [proposed] paragraphs (d)(3) or (d)(4) of this section for the landing facility used, except that the rate of descent shall not be less than 3 degree for operation under VFR when a runway not served by an ILS or VASI is used." Proposed § 91.87 (d)(3) and (d)(4) do not prescribe a rate of descent. They prescribe a descent profile. The rate of descent could vary considerably depending on wind factors and the approach speed of the aircraft involved. As rate of descent is not measured in degrees, it is believed that the reference to a three degree rate of descent is in error, and should read, "* * * rate of descent to be not less than that associated with a 3 degree glide angle," as mentioned in the preamble.

One commenter stated that aircraft exposure to traffic conflicts would be increased due to the greater area needed for large aircraft maneuvering and flying, at times in conflict with the traffic flow of lighter aircraft which do not have to meet those noise abatement procedures. The FAA agrees that examples of such conflicts include cases where the requirements contained in the proposal would cause aircraft at one airport to fly into or across the final approach course of another airport, and cases where jet aircraft descend at high rates through altitudes occupied by general aviation aircraft. This is one aspect in which issuance of the proposal would not be consistent with the highest degree of safety in air commerce or air transportation in the public interest.

One letter observed that the majority of airports around the country without a Terminal Control Area (TCA) have airport traffic areas with radii of five miles and extend upward to 3,000 feet above the elevation of the airport. Aircraft held above 5,000 feet in proximity to such an airport are not necessarily in radio contact with its tower. Consequently, the existence of conflicting traffic may not be known. The FAA agrees with this comment. The imposition of a mandatory 5,000-foot floor, as proposed, would increase the likelihood of traffic conflicts. This is a fundamental objection to the proposed expanded terminal area concept as combined with mandatory altitude floors. Here again, the FAA believes that the proposal would not assure the highest degree of safety.

The proposed requirement that "the rate of descent shall not be less than three degrees" (Proposed § 91.87(d)(1)) in the case of VFR operations is not feasible without some form of vertical guidance to assist the pilot. This requirement does, however, closely parallel changes the FAA plans to implement with respect to nonprecision approach criteria. If the high performance jet aircraft fleet continues to grow at a significant rate, which is the present prediction, then there will be a significant operational need to change FAA policy to expand the number of nonprecision instrument approach facilities to meet this critical need. It is evident that nonprecision approach procedures must be developed to provide a vertical guidance system to as-

sist pilots in stabilizing aircraft descent rates. These procedures must be augmented with an additional descent fix to assure pilots that their aircraft are accurately positioned on a 3-degree approach path at a sufficient distance from the runway so that a normal approach to a landing can be made. However, it is not expected that enough vertical guidance equipment will be installed, in the foreseeable future, to provide an adequate basis for adopting this portion of the proposed regulation at this time. In addition, for the reasons discussed herein, the FAA questions the likelihood that a significant noise benefit would result, and concludes that the most effective tool for dealing with this procedure is a comprehensive order directed at those who control air traffic rather than an inflexible rule directed at pilots.

Several responses to the docket indicate, and the FAA agrees, that it would be difficult to enforce the proposal with respect to VFR approaches at existing facilities. As one commenter indicated, the proposed requirement for VFR turbojet aircraft to begin final descent to the runway from 3,000 feet was unrealistic, unenforceable, and could possibly bring about an unwanted effect whereby pilots might advise that they are unable to maintain their VFR clearance from cloud requirement at 3,000 feet.

Many commenters expressed concern over the reduced flexibility in the handling of traffic which would result from the adoption of the proposal. FAA Order 7110.22B implemented the policy expressed in AC 90-54 concerning the arrival and departure handling of high performance aircraft. Under this Order the arrival and departure procedures allowed the controller some latitude in adjusting descent to meet fluctuating traffic sequences. Adaptation to circumstances would be far less flexible if hard and fast altitudes were required by regulation. As discussed below, experience in implementing this order has provided a firm basis for issuing an improved order to take further advantage of the flexibility in the air traffic control system. Since each airport may have its own peculiarities in traffic handling requirements, the mandatory altitude requirements in the proposal could derogate flexibility and effective airspace utilization. In summary, the FAA believes that the most direct and effective response to aircraft noise in terminal areas is to refine and improve the air traffic control procedures in Order 7110.22B to take better advantage of the potential for noise reduction (and fuel conservation) inherent in the flexibility that the air traffic control system has and that the regulatory solution proposed by EPA does not have.

The intent of the EPA proposal is to minimize the amount of time high performance aircraft operate within the system at low altitudes in terminal airspace. However, the proposal fails to take into consideration the interdependency of arrival and departure operations. In many instances arriving aircraft enter terminal airspace at altitudes below 10,000 feet. In some cases, the flow of traffic is arranged so that the arrival traffic will pass beneath departure traffic climbing to assigned altitudes, or to specified crossing altitudes. Changing this traffic flow would tend to create problems by holding departure aircraft at lower altitudes to avoid conflict with arriving aircraft, with the consequent noise from aircraft climbing at these lower altitudes increasing the total noise exposure for that area.

Another area of concern was the possibility of extended maneuvering or vectoring at many locations and that the additional flight paths would expand the surface areas exposed to noise, increase in-flight delays and fuel usage, particularly at low activity airports or during VFR weather. This is confirmed by the following comments on the Detroit and Tampa evaluation test of a 3,000-foot glide slope intercept altitude.

> With the approach gate extended outbound of its normal location, and the variance of approach speeds, it was virtually impossible to maintain an optimum arrival interval. Under such circumstances spacing outside the gate doubled or quadrupled when a faster aircraft followed a slower aircraft in order to have a minimum of five, four, or three miles spacing, as appropriate, at the end of the runway. Because of the above, succeeding aircraft were extended progressively, longer and longer on their vector because of the 'chain reaction' effect. One controller stated that he actually was forced to place some arrivals into a holding pattern because he eventually ran out of airspace on what turned out to be an unexpected long vector * * *.

Commenters expressed concern over the possible encroachment into the operating airspace of adjacent control facilities and airports, where multiple airport locations would experience increased complexity in working traffic with a resultant decrease in free flow and system capacity if the proposal were adopted. FAA Order 7110.22B specifically exempts TCA locations from compliance with the requirement to establish formal "Keep-'em-High" programs, and from the requirement to establish descent areas. The design of each TCA is on an individual basis, taking into consideration a number of factors and complexities. The mandatory procedures outlined in the EPA proposal could have a severe and far-reaching impact on the air traffic system. High density terminal airspace may serve several airports and involve airspace that has has been carefully designed and assigned to provide the most effective service to all concerned. Facilities operating in such an environment may already be restricted by the amount of airspace available for vectoring and sequencing arriving aircraft. The imposition of the rigid flight patterns of the proposal may force some facilities to expand their vectoring area and interrupt service at adjacent airports. This could actually increase both the noise exposure, aircraft emissions level consumption, and operating costs in the affected airport areas.

It was the opinion of a number of persons making submissions to the docket that the effect upon airport capacity was not given due consideration. One respondent commented that the field evaluation of the 3,000-foot guide slope intercept program (FAA-AT-72-1) at Tampa and Detroit indicated that capacity would be reduced by two percent if all aircraft were required to comply with the proposed rule and this figure would be reduced to only .8 percent if only turbojets were involved. The respondent then commented on the fact that many large air carrier airports have few aircraft other than turbojets, and that a two percent reduction at airports such as O'Hare or Atlanta would have a substantial effect.

Operational tests of a 3,000-foot glide slope intercept were undertaken at Tampa International Airport and Detroit Metropolitan Wayne County Airport to determine the effect those procedures would have on the ATC system. In order to explore alternative methods of applying the 3,000-foot glide slope intercept concept, three variations of the procedure were agreed upon for test purposes:

1. PHASE A. Vector all arriving IFR aircraft so as to maintain at least 3,000 feet AGL until intercepting the glide slope.
2. PHASE B. Vector arriving IFR turbojet aircraft so as to maintain at least 3,000 feet AGL until glide slope intercept, all other aircraft being handled in accordance with existing procedures.
3. PHASE C. Vector all arriving IFR aircraft so as to maintain at least 3,000 feet AGL until five flight path miles from the optimum ILS turn-on point.

Of the three procedures employed during the test period, the most difficulties were experienced during Phases A and B. Phase C had much less impact on the system.

A common complaint of controllers was that they had difficulty gauging the required amount of spacing at the turn-on point to the localizer. Much of the difficulty was attributed to absence of the application of speed adjustment after the arriving aircraft passed the redefined approach gate. After passing that point, pilots were free to apply various techniques to slow the aircraft to the desired speed, which often varied even as between aircraft of the same type. "S" turns and 360 degree turns were necessary in order to achieve or maintain desired separation. In some cases speeds of aircraft differed by as much as 35 knots. Without speed control capability for a greater distance on final approach, the controller, not knowing the pilot technique that would be used in reducing speed, would apply additional spacing as a "fudge factor" to prevent go arounds or 360 degree turns on final. Consequently, the intervals between landings were greater than desired. In this respect, Phase A presented the greatest impact; Phase B, with low performance aircraft being turned on at the regular point of intercept alleviated the effect somewhat. Phase C procedures had only minimal impact.

In the tests where all arriving IFR aircraft or arriving IFR turbojet-aircraft were vectored to a 3,000 foot glide slope

intercept, the controllers were unanimous in stating that the procedures increased workload considerably. These procedures caused longer vector patterns, additional radio transmissions, and limitations on arrival airspace. Aircraft being on the communications frequencies for a greater length of time increased the number of aircraft being controlled at any given time. Controllers experienced difficulty in integrating turbojets with low performance aircraft. When the turn-on was accomplished 13 to 20 miles from the runway, it was difficult to judge spacing of turbojets behind slower aircraft.

Because the traffic flow into and departing from major airports necessitates layered procedures at the surrounding airports, the contention was made that all terminal procedures are not compatible with the proposal. Although it would not be impossible to implement the proposal, the arrival and departure flow at a major airport with surrounding airports would be significantly decreased.

It is difficult to precisely quantity the effects of the EPA proposal on major terminal areas without a complete system-wide evaluation. Such an evaluation would be extremely expensive and could seriously disrupt the ATC system. Experience gained during the Tampa and Detroit studies indicated that operations at the satellite airports in those areas were not affected during the test periods, even though the primary airports were seriously affected. However, operations at satellite airports near primary airports having higher densities of traffic would be affected.

Intra-facility coordination was increased during the test period. This was made necessary by the longer turn-on area spilling over into the departure controller's airspace. Operations in other terminal areas could be altered to a far greater extent.

At smaller airports served by only one or two instrument approach procedures it is often necessary to make the approach to a runway other than the landing runway and then make a circling approach to the landing runway. The presumption was made by many persons that this type of approach would be prohibited. The FAA agrees that the proposal does not account for this situation.

The proposal addressed various altitudes as of "AGL" (Above Ground Level). It appears that the altitudes should be designated as Above Airport Elevation. No adequate method exists for determining altitudes above ground level at all times. However, a determination of the height above the airport elevation is possible.

The EPA proposal would require that, consistent with the previously mentioned altitude minimums, a rate of descent below an altitude of 3,000 feet AGL must be no less than that associated with the existing ILS glide slope at the airport, that the preferable glide slope angle must be at least 3 degrees, and that high performance aircraft operating under VFR must also be subject to a required minimum glide angle below 3,000 feet AGL. These several requirements of the proposed rule cannot be implemented for the following reasons:

1. The angle associated with an ILS glide slope must be determined for a specific runway. It may not be applied as a single, universal airport standard.

2. It is assumed the use of the term AGL is in error and the correct term of reference should be Above Airport Elevation.

3. Aircraft cannot be required, in practice, to maintain a rate of descent associated with a specific glide slope angle since the rate of descent is not measured in degrees. A given rate of descent will not produce a constant glide path angle except in the case of a uniform zero wind condition and a uniform approach speed.

The FAA is acutely aware of the need to constantly examine the procedures used by the ATC system. Recent studies of existing modified programs proved that fuel consumption and the impact of aircraft noise can be reduced while high safety standards are maintained. However, because of the need to closely integrate air traffic departure and arrival flows with the overall safety, efficiency, and environmental objectives of the air traffic control system, the FAA believes that direct management of the ATC function, using a total systems approach, is far preferable to regulations of the kind proposed by EPA, which seriously limit ATC flexibility.

Accordingly, as stated above, a new FAA internal directive, superseding Order 7110.22B (the "keep-'em-high" Order) and aimed directly at FAA air traffic control facilities, has been developed and is being issued. This order, entitled "Local Flow Traffic Management" has been placed in the public docket and is available for examination.

The basic objectives of this new Order include: improved safety through reduced low altitude flying time, standardization of high performance aircraft arrival procedures, equitable distribution of arrival delays through metering, an enhanced effort in noise abatement, substantial fuel savings, and a more efficient ATC system.

The basic concepts contained in the new agency Order have been tested over the past year and have proved safe and effective. They will be applied to every airport where high performance aircraft operate. For the purpose of this Order, a high performance aircraft is defined as all turbojet-powered and turbopropp-powered aircraft weighting more than 12,500 pounds.

These procedures for high performance aircraft are designed to minimize flying time at altitudes below 10,000 feet above airport elevation, and preclude holding or excessive vectoring at altitudes below this level for spacing or delay purposes. Maximum use of profile descents will be made from cruise altitude to the approach gate. A profile descent is defined as an unrestricted descent based on a reduced thrust, and an altitude loss of 300 feet per mile until intercepting the final approach glide path, except where level flight is required for speed reduction.

Departure procedures will be reviewed to insure maximum compatibility with profile descents and new or revised arrival routes. Uninterrupted climbs to cruise altitude will be provided to the extent possible and altitude restrictions below 5,000 feet will be avoided.

Appropriate notices and charts will be published depicting areas of concentrated high performance aircraft flows so that aircraft not in the ATC system can avoid these areas to the extent possible.

In summary, the new order adopts a systems approach to air traffic management that is designed to firmly integrate safety, fuel conservation, and noise reduction objectives into a single national program. It also provides the flexibility needed to allow and encourage change with experience.

The FAA plans initial implementation of this Order on Local-Flow Management this year, with a completion date for all affected terminals in 1978.

In consideration of the foregoing, and under the authority of 611(c)(1)(B) of the Federal Aviation Act of 1958, as amended (49 U.S.C. 1431), the Federal Aviation Administration hereby gives notice that it is not prescribing any regulation, at this time, in response to the proposed noise abatement minimum altitude amendment to Part 91 of the Federal Aviation Regulations as received from the EPA on December 6, 1974, and as published in the FEDERAL REGISTER, as Notice 74-40, on January 6, 1974 (40 FR 1072).

Issued in Washington, D.C., on November 15, 1976.

JOHN L. MCLUCAS,
Administrator.

[FR Doc.76-34177 Filed 11-26-76;8:45 am]

[14 CFR Part 91]

[Docket No. 15020; Notice No. 76-26]

TURBOJET-POWERED AIRPLANES

Delayed Landing Flap Procedure

The Federal Aviation Administration is considering amending Part 91 of the Federal Aviation Regulations (14 CFR Part 91) to add a new § 91.85(d) to require that the landing flap setting for turbojet-powered airplanes be delayed until at or below 1,000 feet above the airport elevation. Since this delayed landing flap procedure is for the purpose of noise abatement on approach and landing, the proposal also provides that the pilot in command may use a landing flap setting at a higher altitude if he determines that it is necessary in the interest of safety.

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Communications should identify the docket number and be submitted in duplicate to the Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket, AGC-24, 800 In-

dependence Avenue, SW., Washington, D.C. 20591. Comments on the overall environmental aspects of the proposed rule are specifically invited. Information on the economic impact that might result because of the adoption of the proposed rule is also requested. All communications received by the FAA on or before January 28, 1977, will be considered by the Administrator before taking action on the proposed rule. The proposal contained in this notice may be changed in the light of the comments received. All comments will be available, both before and after the closing date for comments, in the FAA Rules Docket for examination by interested persons.

Any person may obtain a copy of this notice of proposed rulemaking (NPRM) by submitting a request to the Federal Aviation Administration, Office of Public Affairs, Attention: Public Information Center, APA-430, 800 Independence Avenue, SW, Washington, D.C. 20591, or by calling (202) 426-8058. Communications must identify the notice number of this NPRM. Persons interested in being placed on a mailing list for future NPRMs should also request a copy of Advisory Circular No. 11-2 which describes the application procedure.

I. Background

This proposal is part of the response to an EPA recommended regulation (Notice No. 75-35) concerning flap setting procedures for turbojet-powered airplanes. The other part of this response is published in the "Rule" portion of today's Federal Register and includes an amendment to Part 91 of the Federal Aviation Regulations. This amendment adds a new § 91.85(c) that will require the use of the minimum certificated landing flap setting for turbojet-powered airplanes.

On August 29, 1975, the EPA submitted to the FAA three separate proposed amendments to the Federal Aviation Regulations (FARs) for consideration and publication in the Federal Register under section 611(c) of the Federal Aviation Act of 1958, as amended ("the Act"). Accordingly, the FAA issued Notice No. 75-35 containing EPA's recommended regulations. Notice No. 75-35 was published in the Federal Register on September 25, 1975 (40 FR 44256), inviting interested persons to participate in the making of the proposed rule by submitting written comments.

Pursuant to section 611(c) of the Act and based upon a notice published in the Federal Register on September 25, 1975 (40 FR 44184), a public hearing was held in Washington, D.C., on November 5, 1975, to receive oral and written statements on the matters contained in the notice. Written statements submitted and a transcript of the oral statements are included in the regulatory docket.

The FAA gave due and careful consideration to the information provided by the EPA, by federal government-sponsored research programs, by the comments submitted to the regulatory docket. In addition, the FAA consulted with the EPA and with the Secretary of Transportation. Based on an analysis of this information and after consultation, the FAA concluded that it should adopt an amendment to the FARs based on EPA proposed reduced flap setting noise abatement procedure but should not prescribe regulations based on the EPA two-segment approach procedure. An amendment to Part 91 of the Federal Aviation Regulations to add a new § 91.85(c) and the notice of decision not to prescribe two-segment approach requirements are published in the "Rules" portion of today's Federal Register.

II. Reduced Landing Flap Setting Procedures for Civil Turbojet-Powered Airplanes

As stated in Notice No. 75-35, the EPA proposed to amend § 91.85 of the FARs to provide noise relief to communities in the vicinity of airports by prescribing reduced flap setting procedures for civil turbojet-powered airplanes. This proposal was based on studies referenced in the EPA proposal showing that an approach made with less than full landing flaps reduces aircraft noise as compared to a full flap approach. Since the airframe drag at the reduced setting is less, lower power is required. The reduced flap procedure for each type of turbojet-powered airplane would, as proposed, consist of the minimum final flap setting shown in the Airplane Flight Manual that is appropriate and safe for landing based upon such factors as load, weather, runway conditions, etc. However, the EPA proposal expressly recognized that each pilot in command of an airplane has the final authority and responsibility for the safe operation of his airplane. Therefore, if the pilot in command determines that a higher flap setting for that airplane should be used in the interest of safety for a particular approach and landing, the pilot may use the higher flap setting.

The explanation for the EPA reduced flap proposal stated that certain air carriers are currently using a reduced flap procedure and that the Air Transport Association recommended continuation of the reduced flap approach. The explanation further stated that "[s]ince the procedure is considered safe and will achieve an appreciable reduction in noise caused by civil turbojet engine-powered airplanes, it is proposed to make the use of a reduced flap procedure mandatory for all civil turbojet engine-powered airplanes."

The flap setting procedures developed by the Air Transport Association (ATA), which are currently used by many air carrier pilots for noise abatement (and fuel conservation) purposes at all airports with many types of approaches (ILS, VOR, Visual, etc.), both IFR and VFR, are as follows:

1. Approach the airport area at as high an altitude as possible in accordance with current ATC procedures.

2. Remain in a clean configuration for as long as possible.

3. Proceed in-bound from the final approach fix, or a similar distance for a visual approach, with flaps at one setting less than final landing flaps planned for the particular landing.

4. Extend final landing flaps at a point on final approach at which the aircraft is 1000 feet above field elevation, equipment performance permitting, with stabilization at not less than 500 feet above field elevation.

5. Use the lowest allowable landing flap setting which is permissible for the particular landing.

The ATA procedures also recommend that initiation of each successive flap extension be made at a speed near the minimum speed, for that particular configuration, to maximize noise abatement benefits. The FAA encourages air carriers to use these procedures and has approved their use, on a case-by-case, by individual operators where fully consistent with safety. In addition to issuance of the reduced landing flap requirements, the FAA is continuing its effort to encourage broader use of these procedures where consistent with the highest degree of safety for each operator on an individual basis.

The EPA proposed rule differed from the procedure recommended by ATA. Proposed § 91.85(c) would require pilots of all turbojet-powered airplanes to "use the minimum certificated flap setting set forth in the Airplane Flight Manual that is appropriate to each phase of the approach and landing." However, there is no minimum certificated flap setting appropriate to each phase of the approach and landing since there are no defined phases of the approach and landing in the regulations or in the Airplane Flight Manual. The ATA procedure, however, defines two points in the arrival path of the airplane—the final approach fix or a similar distance for a visual approach; and 1,000 feet above the field elevation on final approach.

The FAA does approve certain landing and approach flap settings that are included in approved performance information in the Airplane Flight Manual. In addition, certain larger airplanes have more than one approach flap setting and more than one landing flap setting.

The amendment to Part 91 to add a new § 91.85(c) will require the use, for pilots of turbojet-powered airplanes, of the minimum certificated flap setting for the appropriate conditions. However, the FAA does not specify when in the arrival sequence the approach or landing flap setting must be used. The FAA believes that delaying the final landing flap setting to a point where a stabilized final approach can still be achieved is a valid means of abating noise during the early phases of the approach without compromising safety.

In consideration of the success of the delayed landing flap procedure recommended by ATA (item no. 4) and the FAA's determination that adoption of this procedure in the amendment would be beyond the scope of EPA proposed § 91.85(c) concerning reduced flaps, the FAA is proposing a rule to specify the highest altitude at which the landing flap setting can be selected.

III. DELAYED LANDING FLAP PROCEDURE

The flap setting selected by the pilot during each phase of the approach is determined by several variable factors, including the rate of descent required, the traffic mix, airspeed restrictions, airplane landing weight, the runway being used, and other conditions which may apply only at a particular airport. In the interest of fuel conservation, a pilot will normally remain in as clean a configuration as possible (e.g., a minimum flap setting) within a range of airspeeds to provide a maneuvering speed which is both safe and adaptable to the next phase of the approach. The objective of the pilot is to arrive at a point on final approach from which a stabilized approach can be maintained to landing. By effectively minimizing the variables through a constant configuration, airspeed, rate of descent, drift correction, etc., the pilots can devote their full attention to evaluating such information as wind shear, changing weather, traffic advisories, ATC requests, and possible emegencies. The FAA believes that the value of the stabilized approach is highly significant in porviding the highest degree of safety during the approach and landing.

The Air Transport Association's recommendation for a reduced and delayed final landing flap setting embodies the stabilized approach concept. The final landing flap setting (minimum certificated), is selected no earlier than 1,000 feet above the airport elevation, permitting aircraft attitude and airspeed adjustments to be made such that a stabilized approach is achieved no lower than 500 feet above the airport elevation.

The National Business Aircraft Association (NBAA) also endorses a similar procedure in the interest of noise abatement. However, their procedures distinguish between VFR and IFR conditions, as stated in the NBAA Noise Abatement brochure, dated October 1973;

1. VFR—Downwind and base leg, or straight-in approach, shall be at a maximum IAS of 160K, with not more than takeoff flap (or approach flap, if applicable). After passing one mile mark inbound from threshold, full flap may be used.

2. IFR—IAS and altitudes as directed by Approach Control, but not to exceed 250K IAS or less than $V_{1.4}$ at takeoff (or approach, if applicable) flap. Maximum of takeoff (or approach, if applicable) flap to the outer marker, with landing flap delayed until required.

In order to achieve the maximum noise abatement benefits during the approach phase, the FAA believes that delaying the landing flap setting until a point on final approach where a stabilized approach can be established and maintained to landing, that safety would not be derogated. In light of NBAA's and ATA's operational success with the delayed flap procedure, substantial noise abatement benefits may be achieved if the operators of all turbojet-powered airplanes were to delay the landing flap setting.

The FAA believes that delaying the landing flap setting until 1,000 feet above the airport elevation will enable all operators of turbojet-powered airplanes to achieve a stabilized approach to landing. However, the FAA also believes that the pilot in command should have the final authority and responsibility for the safe operation of his airplane. Therefore, if the pilot in command determines that it is necessary in the interest of safety to select a landing flap setting at a higher altitude for a particular approach he may do so.

The FAA believes that the delayed flap procedure can be applicable to all civil turbojet-powered airplanes at all airports under both VFR and IFR conditions. In addition, the FAA believes this procedure is appropriate for all types of approaches.

Commenters are also invited to discuss alternative choices which could be used to define the earliest point where the landing flap setting could be made. Such points are as follows:

1. Final approach fix inbound.

2. Interception of the glide slope on a precision approach.

3. Commencement of descent to landing minimums on all precision and straight-in nonprecision approaches.

4. 1,000 feet above airport elevation for VFR conditions only.

If a commenter believes that one of these alternatives is better than the FAA proposal, the commenter is requested to discuss the safety, environmental, economic, and other operational considerations as thoroughly as possible. In addition, commenters are invited to discuss why any one of the alternative choices would not be appropriate.

Commenters should note that the reduced landing flap procedure discussed previously in this document and published in the "Rules" portion of today's FEDERAL REGISTER is applicable only to pilots of turbojet-powered airplanes with more than one certificated landing flap setting. However, the proposed delayed flap procedure is applicable to pilots of all turbojet-powered airplanes regardless of the number of approved landing flap settings.

(Secs. 307(c), 313(a), 601, 611(b), Federal Aviation Act of 1958, as amended (49 U.S.C. 1348(c), 1354(a), 1421, and 1431(b)); sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)); Title I of the National Environmental Policy Act of 1969 (42 U.S.C. 4321, et. seq.); and Executive Order 11514, March 5, 1970.)

In consideration of the foregoing, the Federal Aviation Administration proposed to amend Part 91 of the Federal Aviation Regulations (14 CFR Part 91) by adding a new § 91.85(d) to read as follows:

§ 91.85 Operating on or in the vicinity of an airport; general rules.

* * * * *

(d) The pilot in command of a turbojet-powered airplane may not select a landing flap setting until at or below 1,000 feet above the airport elevation unless he determines that it is necessary in the interest of safety to select a landing flap setting at a higher altitude.

NOTE.—The Federal Aviation has determined that this document does not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A-107.

Issued in Washington, D.C. on November 15, 1976.

R. P. SKULLY,
Director,
Flight Standards Service.

[FR Doc.76-34178 Filed 11-26-76;8:45 am]

[14 CFR Parts 121, 129]

[Docket No. 14318; Reference Notice No. 75-6]

PROPOSED REGULATIONS SUBMITTED BY THE ENVIRONMENTAL PROTECTION AGENCY TO THE FAA: FLEET NOISE LEVEL REQUIREMENTS

Decision Not to Prescribe Regulations

Notice is hereby given that the Federal Aviation Administration (FAA) has decided not to prescribe amendments to the Federal Aviation Regulations (14 CFR Part 121 and 129) concerning the Fleet Noise Level Requirements (FNL) that were proposed by the Environmental Protection Agency (EPA). The proposed amendments were published in the FEDERAL REGISTER in Notice 75-6 (40 FR 8222, February 26, 1975).

The FAA's decision is in accordance with the requirements of section 611 of the Federal Aviation Act of 1958, as amended. It was reached after due and careful consideration of the EPA recommended regulations, the comments received at a public hearing and those submitted to the regulatory docket, and consultations with the EPA.

I. BACKGROUND

Section 611(c)(1) of the Federal Aviation Act of 1958, as amended by the Noise Control Act of 1972 (Pub. L. 92-574; 86 Stat. 1234, October 27, 1972), provides that the Environmental Protection Agency (EPA) shall submit to the Federal Aviation Administration (FAA) proposed regulations, to provide such control and abatement of aircraft noise and sonic boom as the EPA determines are necessary to protect the public health and welfare. In considering proposals submitted by EPA, the FAA must publish the proposed regulations in a notice of proposed rulemaking (NPRM) within 30 days of the date of submission to the FAA. Within sixty days after publication of the NPRM, the FAA must conduct a public hearing at which interested persons may participate by making oral or written presentations regarding the proposals contained in the NPRM.

Section 611(c)(1) of the Federal Aviation Act further provides that within a reasonable time after the conclusion of the public hearing and after consultation with the EPA, the FAA must—

1. Prescribe regulations that are either substantially as submitted by the EPA, or that are a modification of the EPA proposal; or

2. Publish in the FEDERAL REGISTER a notice that is not prescribing any regulation in response to EPA's submission, together with a detailed explanation providing reasons for the decision not to prescribe the EPA's proposed regulations. (This document constitutes such an explanation.)

On January 28, 1975, the EPA submitted a proposal to the FAA to prescribe amendments to the Federal Aviation Regulations to require each air carrier fleet operator under Parts 121 and 129, to report, annually, its Fleet Noise Level (FNL) and the noise data and operational information used to compute the reported FNL.

Subsequently, on February 26, 1975, the FAA published two notices in the FEDERAL REGISTER: A notice of proposed rulemaking (notice No. 75-6, 40 FR 8222) that contained the EPA recommended amendment to the Federal Aviation Regulations, and a Notice of Public Hearing (FR 8243), which announced that, on April 17 and 18, 1975, the FAA would hold a public hearing, in Washington, D.C., concerning the subject EPA proposal. This hearing was held. Interested persons participated by making oral and written presentations.

II. THE DECISION NOT TO PRESCRIBE REGULATIONS

After due and careful consideration of the recommended regulations, the comments received at the public hearing and those submitted to the regulatory docket, and consultations with the EPA, the FAA has determined that the EPA proposed FNL requirement would impose an unwarranted reporting and testing burden on regulated persons without an offsetting incease in present or future relief and protection to the public health and welfare from aircraft noise. Accordingly, the FAA is not prescribing the EPA's recommended regulation at this time. The FAA's determination is based on a number of factors, including the following:

1. Since the proposed FNL regulation would not contain any enforceable noise abatement or control provisions, it would be only reportorial in nature. Consequently, it can not be expected to result in any measured or perceived reduction of aircraft noise emission levels.

Furthermore, for the reasons discussed below, the FAA has not identified any fleet management incentives to reduce noise that would be created or strengthened by an operator's reporting his fleet noise information. Consequently, the proposed regulation cannot be expected to result in any measured or perceived reduction of aircraft noise emission levels.

2. The proposed formula for computing the FNL does not adequately account for variables, such as operating weights and the size of exposed populations. Consequently, the FNL would not accurately describe the actual noise impact which a given aircraft fleet has. Additionally, since operators operate different types of aircraft into a wide variety or airport environments, the FNL formula would not even enable one to make meaningful comparisons of the noise exposure levels produced by different operators or to determine whether the noise exposure created by a given operator is actually changing from year to year or whether it can be reduced in a reasonable manner. But, more importantly, it would not enable one to determine how the FNL of a given fleet affects the public health and welfare.

3. As proposed, the FNL would not apply to certain aircraft which also contribute to community noise impact.

4. Because of the lack of a clear relationship between the proposed FNL concept and the actual noise impact of a fleet, the resulting FNL values and the conditions which they represent would be easily susceptible to misinterpretation or misapplication.

5. A substantial cost would be incurred in accomplishing the noise flight testing needed to derive, under Part 36, the noise levels of each airplane type that has not already been tested under that regulation.

III. PRIOR FNL PROPOSAL

The FAA previously proposed (Advance Notice 73-3, 38 FR 2769, January 30, 1973) a fleet noise level concept similar to the one in the EPA's current proposal. Like the EPA's the foundation of the FAA's FNL proposal was based upon the use of a logarithmic formula to determine an operator's FNL value.

The public comments in response to the FAA's proposed concept were almost unanimously opposed to the use of a logarithmic formula. After full review and analysis of these comments, the FAA decided that the formula could not be supported, so far as its validity was concerned. The FAA now believes that the objective of the FNL concept can best be attained by use of a required time schedule for noise reduction. Such a time schedule is embodied in the FAR 36 compliance rule to be issued by the FAA before the end of 1976. The FAA believes further that the use of an FNL concept based on a logarithmic equation, as first proposed by FAA and later by EPA, cannot be supported. FAA's reasons are discussed below.

IV. FACTORS CONSIDERED

FAA's decision not to prescribe regulations in response to the proposed FNL concept is based on consideration of the following issues, and review of numerous comments received from aviation trade associations, aircraft manufacturers, environmentalists, citizen groups, and state and local governments, and other interested persons.

A. FLEET NOISE LEVEL CALCULATION

Under the EPA's proposed regulation, an operator would use a logarithmic average formula to calculate his FNL in terms of effective perceived noise level (EPNL). The formula takes into account the noise levels of each airplane in the operator's fleet. The procedure for measuring the noise generated by each airplane is that specified in FAR Part 36 for type certification for turbojet and transport airplanes. The formula is:

$$\mathrm{FNL} = 10 \log \frac{\sum_{j=1}^{n} Nj \text{ antilog } Lj/10}{\sum_{j=1}^{n} Nj}$$

Where: FNL=Fleet Noise Level (EPNL—units of dB)
Nj: The number of operations of a given aircraft (type j) during a specified time period.
Lj: The noise level produced by aircraft type j.

It is FAA's judgment that a logarithmic formula is inferior to the use of a phased time schedule for reducing an operator's total noise impact. Several commentators offered similar statements to the effect that the logarithmic formula would be inappropriate for calculating the FNL. They generally emphasized (1) that the logarithmic formula fails to give the necessary credit to the quieter aircraft, and (2) that the formula does not adequately reflect the subsequent inclusion (after the initial computation of a fleet's FNL) of quieter airplanes within a fleet. The FAA agrees with these comments. This is more fully shown in Appendix A below.

It should be noted that Appendix A's calculations show that a progressive substitution of as much as a 50 percent mix of quieter airplanes results in only minor changes in the FNL. Thus, a meaningful incentive to acquire quieter aircraft would not result from the formula as submitted by EPA.

The EPA recognized in its proposed regulation that "the noisiest airplanes are given the most emphasis by the formula, clearly indicating which airplanes produce the greatest noise impact and which need the most noise control." However, no consideration appears to be given to the potentially negative effect the formula might have on an operator's consideration of whether he should later include quieter aircraft within his fleet.

One commentator stated that, based on the assumption that quieter airplanes result from new technological developments, and given the fact that quieter aircraft have only a minor effect on FNL, the proposed FNL regulation would not necessarily encourage the development of new noise reduction technology. On the other hand, an airplane manufacturer stated that noisier airplane domination of FNL would discourage the acquisition of the heavier, more efficient, airplanes. During his presentation at the public hearing, one commentator expressed the opinion that the proposed rule "does not recognize significant progress until virtually complete achievement is obtained." The FAA agrees with this comment. This can be shown mathematically, using the formula in Appendix A.

Another comment along similar lines pointed out that FNL is sensitive only to the relative mix of airplanes, and is not sensitive to the total number of operations. FAA's analysis of this assertion is also shown in Appendix A, where FNL values for two identical fleets but with grossly different numbers of operations are calculated. These calculations support the above comment.

B. NOISE IMPACT; HEALTH/WELFARE EFFECTS

One commentator noted that the FNL concept does not weigh human impact or measure real noise exposure in terms of people affected.

FAA agrees that the proposed FNL concept would not describe actual noise impact. A large number of factors affect noise impact. These include seasonal effects, equipment and airport operating characteristics, flight paths, altitude, takeoff and landing procedures, percentage of day/night operations, and size and demographic distribution of exposed populations. None of these factors are considered in the FNL formula.

Because of the insensitivity of the proposed FNL concept to these factors, and particularly in view of the inability of a single FNL number, of the kind proposed, to reflect the actual impact of a given fleet on human annoyance, the FAA believes that the proposed FNL concept is not reasonably related to public health or welfare effects. This lack of such a relationship severely limits the probable value of the proposed FNL concept in terms of its accuracy as an index of the noise reduction progress of a particular fleet and as an incentive on fleet operators to reduce noise. Furthermore, if the FNL values were later made enforceable by regulation, the resultant legal burden would not be reasonably related to public health or welfare effects.

C. COMPARISON OF FNL FOR DIFFERENT OPERATORS

The EPA proposed regulation computes the FNL according to Part 36 type certification procedures. This requires using type certification airplane weights and flight procedures or approved equivalent procedures. However, it should be noted that (1) only rarely, if ever, are aircraft in service operated at their certification weights and according to their certification flight procedures and (2) the noise that an airplane emits is dependent upon such variables as its actual operating weight and the number of operations, and patterns of flight over noise sensitive populations.

The variables even differ among operators with similar equipment. Operators with similar equipment could have the same value of FNL and yet generate different noise exposure in terms of actual impact on the public. For example, because of the insensitivity of the proposed FNL concept to the number of persons affected on the ground, two fleets with identical FNL values and similar equipment could have markedly different noise impacts. This is also true because of the above mentioned insensitivity of the proposed FNL concept to seasonal effects and the different impacts of day and night operations.

The inability to meaningfully compare operators on the basis of their respective FNL values can also be seen in the situation in which there are two operators with the same FNL values but one operator has 1000 operations of a given aircraft type while the other has only ten. The noise exposure generated by the operator with 1000 operations is significantly more notwithstanding the fact that both fleets have the same FNL values Appendix A also illustrates this situation.

D. FNL BASED ON LESS THAN MAXIMUM WEIGHTS

The proposed regulation specifies that an operator may use reduced noise levels in the computation of FNL if: (1) He operates his aircraft at reduced weights (2) He accepts such reduced weights as his operating maximum and (3) The noise levels based on the reduced weights are approved by the Administrator of the FAA.

One commentator stated that an operator whose activity is typically at weights less than maximum weight could accept the lesser weight limitation at some future point and actually reduce his approved FNL value (previously computed on the basis of maximum weights). Because of the operator's reduced FNL value, he would appear to be creating less noise when in fact there would be no reduction in actual noise impact on exposed populations.

It is FAA's viewpoint that the weight limitation and required corresponding noise data would lead to severe problems of interpretation and implementation. This is because there is no existing noise data for computing FNL values on the basis of reduced operating weights. Such data is not presently required under Part 36. Given the extremely wide range of types, series, models, and other industry-established subcategories of airplane types, and given the possible range of approved weight limits for each such subcategory, the burden of deriving accurate noise data under Part 36 for each airplane variant is potentially very large. And, because of the factors discussed above, the FAA has not discovered a means of deriving an FNL value, for a given fleet composed of many airplane types, models, and series, that is meaningful in its relationship to the actual noise impact of that fleet. Absent this clear relationship, the added burden of recertificating airplanes at weights less than maximum weight is not economically reasonable.

E. NOISE TESTING COSTS

In addition to recertification noise testing of airplanes already type certificated under Part 36, there would also be a burden of full noise testing, under Part 36, for airplane types that have never been tested under Part 36. This burden could be extremely great for individual fleets that include airplane types for which approved noise levels have not previously been established under Part 36.

To appreciate the magnitude of the potential economic impact of this aspect of the EPA's proposed regulation, consider the FAR 36 noise certification costs for a single family of airplanes—the 727 family. Approximately $3.5 million has been spent thus far to demonstrate (by means of FAA approved precedure equivalent to FAR Part 36, Appendix A) compliance with FAR Part 36 noise certification standards. Note that the EPA proposal would require FNL values for takeoff, for approach and for sideline. Based on the reasonable assumption that operators would request FNL values based upon a variety of reduced weights, it is conceivable that the FAR Part 36 noise certification program could be expected to increase at least three times for a single family of airplanes. Thus, a typical cost for obtaining the required noise data, using FAA approved equivalent procedures, would be approximately $10 million for a single family of airplanes. When considered in relation to the extremely limited value of the proposed FNL concept as a true index of fleet noise impact these costs cannot be justified.

F. REGULATION OF FOREIGN OPERATORS

Several commentators were opposed to unilateral action by the United States to propose FNL regulations on foreign operators without prior discussion of these regulations in the International Civil Aviation Organization (ICAO). The FAA believes that, where consistent with necessary domestic environmental objectives, every effort should be made to work through ICAO. In addition, international comments are fully considered by the FAA in its establishment of regulatory policies affecting international aviation. In this case, the objections to the proposed FNL discussed herein apply to foreign as well as domestic fleet operators. In addition, foreign fleets typically operate heavy aircraft types with intercontinental range. These aircraft would tend to generate high FNL values that, for reasons discussed above, would not be demonstrably related to the actual noise impact of the U.S. operations of those fleets. In view of the extremely tenuous relation between derived FNL values and actual noise impact, the burden of compliance is no more justified for foreign operators than it is for U.S. operators.

G. NOISE REDUCTION INCENTIVES

The preamble to Notice 75–6 contained EPA's assertion that issuance of FNL values, as proposed, would create incentives to develop and apply current and future technologies for reducing noise levels, and would encourage the phase-out of existing aircraft and their replacement with quieter aircraft. The FAA questions this conclusion. While there is a mathematical relation between the Part 36 noise levels of individual airplanes and the composite FNL value of a fleet, the responsiveness of computed FNL values to individual airplane noise levels is so slight that the application of even the most advanced noise reduction technology would have only minor effect on computed FNL values. Even a fleet management effort to reduce noise by acquiring quieter aircraft, combined with a reduction in total operations, would have little overall effect on the computed FNL value for the fleet. There is, thus, no basis for concluding that the FNL concept, as proposed, contains an inherent incentive to reduce noise.

The FAA believes that a stronger possibility exists that widespread use of the

FNL concept could actually stand in the way of other incentives to reduce noise. For example, air carrier management sensitivity to noise problems may be adversely affected because an FNL value, lower than that of competing carriers, is compiled for that air carrier. The air carrier with the lower FNL may, logically, conclude that the FAA has determined that less noise impact is caused by that carrier than one that had a higher FNL (but that has lower actual noise impact because of numbers of operations, distribution of operations, or other similar factors). Any incentive on this carrier in a competitive market would appear to support decisions not to reduce noise. In addition, the fleet with the higher FNL would have little incentive to reduce noise since, as stated above, further cutbacks on operations and introduction of new technology would have at best a minor impact on FNL.

H. EXCLUSION OF CERTAIN AIRPLANE CLASSES

The proposed FNL concept is limited to subsonic airplanes and future supersonic airplanes. Thus, in addition to the factors discussed above that severely limit the value of the proposed FNL concept itself as an accurate description of cumulative fleet noise impact for airplanes covered by it, the concept does not account for the possible impact of the current generation of supersonic aircraft. Furthermore, the proposed FNL concept, being limited to turbojet engine powered airplanes, contains no incentives to introduce turbopropeller engine powered airplanes, which, in some forms, may be markedly quieter than some types of turbojet engine powered airplanes.

The combined effect of these two exclusions is that a fleet currently operating subsonic turbojet engine powered airplanes could introduce any volume of current types of supersonic aircraft with no FNL accountability, and would receive no FNL credit for introducing quieter turbopropeller engine powered airplanes.

I. MISCELLANEOUS COMMENTS

The regulatory docket received several comments which addressed relevant matters not previously discussed under specific topics.

One commentator stated that the proposed regulations would provide an enforcement technique for use when FAR 36 levels are reduced. It is true that the FNL concept, as proposed, could be amended later to require the management of fleets so that specified FNL values are not exceeded. However, in view of the lack of a clear connection between computed FNL values and actual fleet noise impacts, it is not probable that the later addition of enforceable FNL limits would serve a useful purpose. This conclusion would not appear to be altered by altering Part 36 noise limits, since the chief defect in the proposed FNL concept is not that Part 36 noise levels are too high, but rather, that, regardless of individual airplane noise levels derived under Part 36, the relationship between the composite FNL values and the public health and welfare has not been established.

Another commentator who agreed with the theory of FNL suggested refinements which would (a) allow people to assess the impact of FNL on specific airports, (b) allow a weighted assessment of day and night noise impacts, and (c) enable assessment of the effect of changed flight procedures. The FAA agrees with these objectives. However, information received at the public hearing and otherwise submitted to the docket does not furnish a basis for formulating a regulatory proposal, at this time, that would accomplish these objectives. Another individual suggested that the FNL rule should be "coordinated" with FAR 36 requirements although no information was provided to show what form this "coordination" would take or how it would be accomplished.

One commentator stated that FNL would provide information needed by airlines to facilitate planning but made no suggestions as to how that could be achieved. The point was also made that airport operators need to know particular FNL values. Because of the above mentioned lack of a supportable correlation between computed FNL values and the actual noise created in given airport environments by a particular air carrier, the FAA believes that no constructive purpose would be served by generating FNL values, under the proposed regulation, and furnishing these values to airport or air carrier management.

In consideration of the foregoing, and under the authority of section 611(c)(1) of the Federal Aviation Act (49 U.S.C. 1431), the Federal Aviation Administration hereby gives notice that it is not prescribing any regulation at this time in response to the proposed fleet noise level amendments to Parts 121 and 129 as received from EPA on January 28, 1975, and published in the FEDERAL REGISTER, as Notice 75-6, on February 26, 1975 (40 FR 8222).

Issued in Washington, D.C., on November 15, 1976.

JOHN L. MCLUCAS,
Administrator.

APPENDIX A—FLEET NOISE LEVEL SAMPLE CALCULATIONS

$$FNL = 10 \log_{10} \frac{\sum_{j=1}^{n} (Nj) \text{ antilog } (Lj/10)}{\sum_{j=1}^{n} (Nj)}$$

For two hypothetical fleets with the same aircraft composition and FAR 36 takeoff noise levels of 110 EPNdB, one fleet having 1000 operations and the other having only 10 operations, their FNL value would be calculated as follows:

$$FNL_1 = 10 \log \left[\frac{(1000 \text{ antilog } 110/10)}{(1000)} \right]$$

$$FNL_1 = 10 \log \frac{(1000 \times 10^{11})}{1000} = 10 \log \frac{10^{14}}{10^3}$$

$$FNL_1 = 10 \log 10^{11} = 110$$

$$FNL_2 = 10 \log \left[\frac{(10 \text{ antilog } 110/10)}{10} \right]$$

$$FNL_2 = 10 \log \frac{(10 \times 10^{11})}{10} = \frac{10 \log 10^{12}}{10}$$

$$FNL_2 = 10 \log 10^{11} = 110$$

Note that both fleets have the same FNL value even though one operator had 100 times as many operations of the same aircraft type as the other. Similar results would be obtained for the assumption of the same mix of different types of aircraft by the two operators but with different numbers of operations.

If the above fleet with 1000 operations is modified so that 25 percent of its operations are flown by airplanes with levels 10 EPNdB quieter, the following FNL would be calculated as follows:

$$FNL = 10 \log \frac{(750 \text{ antilog } 110/10 + 250 \text{ antilog } 100/10)}{1000}$$

$$= 10 \log \frac{(750 \times 10^{11} + 250 \times 10^{10})}{1000}$$

$$= 10 \log (775 \times 10^8)$$

$$= 108.9$$

Note that the fleet's FNL is reduced only 1.1 db.

Carrying these examples one step further so that 50 percent of the fleet's operations are with the quieter airplanes results in a FNL of 107.4.

$$FNL = 10 \log \frac{(500 \text{ antilog } 110/10 + 500 \text{ antilog } 100/10)}{100}$$

$$= 10 \log \frac{(500 \times 10^{11} + 500 \times 10^{10})}{1000}$$

$$= 107.4$$

Thus, replacing half of the fleet with 10 dB quieter airplanes results in a total reduction of 2.6 dB.

An even more extreme case is presented by assuming that half of the fleet operations are performed by airplanes with noise levels of 80 EPNdB, the approximate level of airframe noise with no engine noise present at all.

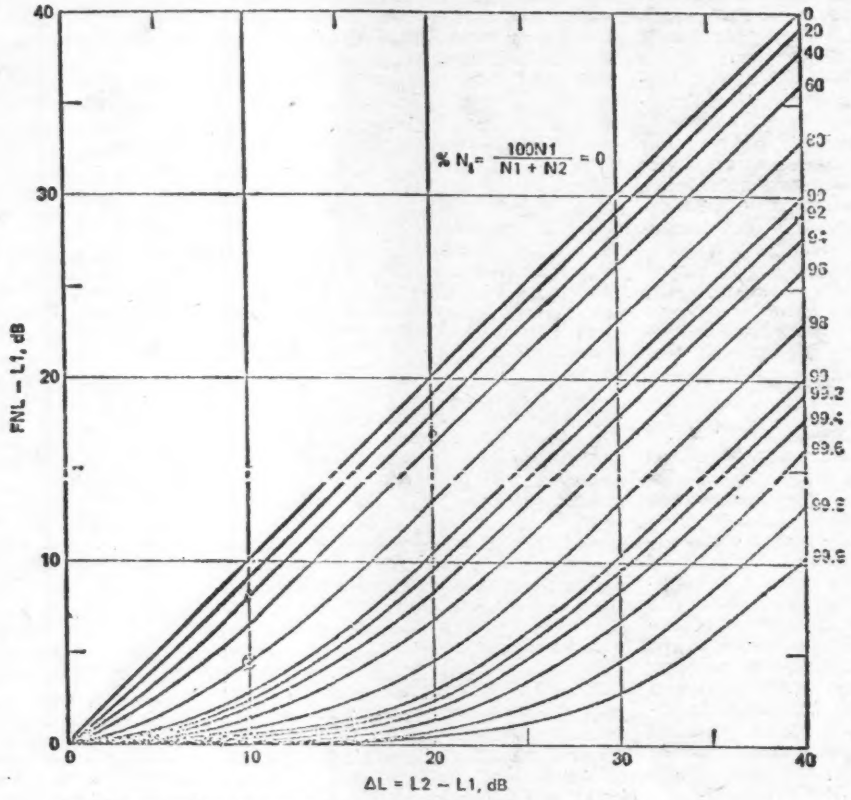
$$FNL = 10 \log \frac{(500 \times 10^{11} + 500 \times 10^{8})}{1000}$$

$$= 106.9$$

As shown, replacing half of a fleet with theoretical airplanes with no engine noise results here in a reduction in FNL of only 3.1 dB.

These examples illustrate (1) how FNL values are unaffected by relative numbers of

operations and (2) also how FNL values are dominated by noisier airplanes. As illustrated, substitution of large numbers of quieter operations has a minor impact on FNL. This brings into question the validity of the assertion that a FNL rule would encourage either new technology or the introduction of quieter airplanes.



L1 = LEVEL OF LEAST NOISY AIRCRAFT, dB (EPNdB).

N1 = NUMBER OF OPERATIONS OF LEAST NOISY AIRCRAFT.

L2, N2 = SAME AS ABOVE FOR NOISIER AIRCRAFT.

FNL = FLEET NOISE LEVEL, dB (FNdB).

FIGURE 1. FLEET NOISE LEVELS FOR TWO AIRCRAFT.
(a) VERSUS ΔL FOR 0-40 dB RANGE.

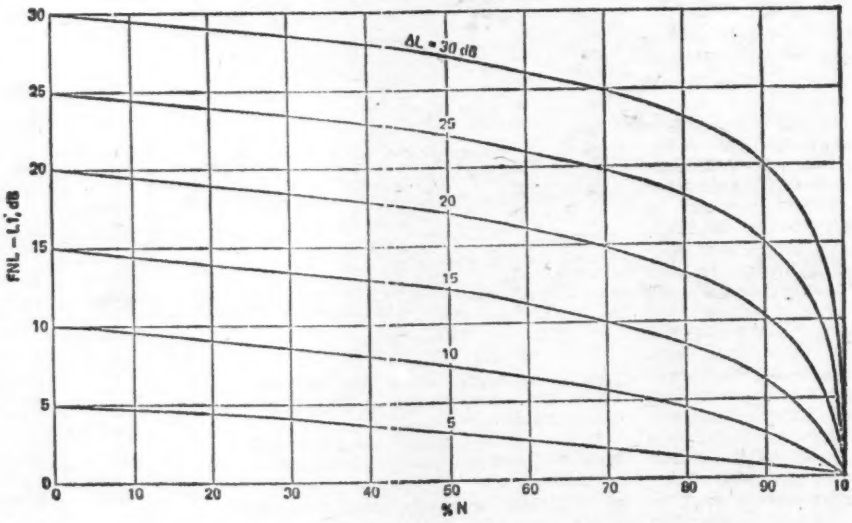


FIGURE 2 FLEET NOISE LEVELS FOR TWO AIRCRAFT.
(c) VERSUS % N

[FR Doc.76-34176 Filed 11-26-76;8:45 am]